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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/648,857

08/25/2003

Kcishi Takeyama

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EXAMINER

HANDAL, KAITI V

ART UNIT

PAPER NUMBER

1764

MAIL DATE

DELIVERY MODE

08/22/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/648,857

Applicant(s)

TAKEYAMA ET AL.

Examiner

Kaity Handal

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 June 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) _____ is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-11 and 23-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/15/2007 has been entered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Keegan et al. (US 2002/0081471 A1).

With respect to claim 1, Keegan teaches an apparatus comprising: a micro reactor/reformer (figure 4) (page 4, paragraph [0049], lines 1-8) in which a flow path is formed for a fluid (as illustrated by inlet (120) through outlet (125)); and

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container/system enclosure (130 & 220) which accommodates the micro reactor and keeps/(controls) an atmosphere on a periphery of the micro reactor at a pressure (Abstract) (page 4, paragraph [0051], lines 1-13); an inlet pipe and an outlet pipe which are connected to the flow path of the micro reactor, and which extend outward from the container and are sealed to the container (page 4, paragraph [0044]).

Regarding limitations recited in claim 1 which are directed to a manner of operating disclosed device, neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, process limitations do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

Regarding claim 1, Keegan teaches all of the claims limitations as set forth above, but the reference does not explicitly disclose the specific pressure under which the reformer is kept while in operation. The specific pressure is not considered to confer patentability to the claims. As the reactor efficiency of operation and reliability are variables that can be modified, among others, by adjusting said pressure under which the reformer is kept, with said reactor efficiency of operation and reliability both improving as the pressure is adjusted accordingly, the precise pressure would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without

showing unexpected results, the claimed pressure cannot be considered critical.

Accordingly, one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the pressure in the apparatus of Keegan to obtain the desired balance between the reactor efficiency and reliability (*In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (*In re Aller*, 105 USPQ 223).

4. Claims 1-2, 4-9, 11-12, 23 and 25 are rejected under 35 U.S.C. 102(e)/103(a) as being anticipated by Faville et al. (US 6,562,496 B2).

With respect to claim 1, Faville teaches an apparatus comprising: a micro reactor/reformer (fig. 1, 123) comprising a flow path (as illustrated by inlet (101) through outlet (107)); and container/ hot box (106) which accommodates the micro reactor (123) and keeps an atmosphere on a periphery of the micro reformer (123) at a pressure (see Abstract); Faville discloses wherein said micro-reformer (fig.1, 123) is contained within hot box (106) wherein said hot box (106) is maintained (which means kept) at a pressure (P3) which is lower than the pressure (P2) of the system enclosure (100) which is outside of said hot box (106) (col. 9, lines 31-39); Faville further illustrates the presence of an inlet pipe and an outlet pipe which are connected to the flow path of the micro reactor, and which extend outward from the container/hot box (106), Faville however does not explicitly teach details on sealing

the respective pipes, but since Faville teaches that the hot box (106) containing the reformer (123) is maintained at a certain pressure, therefore it would be obvious that the pipes connected to the flow path of the micro reactor would be sealed in order to maintain the pressure setting within the apparatus.

Regarding limitations recited in claim 1 which are directed to a manner of operating disclosed device, neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, process limitations do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

Regarding claim 1, Faville teaches all of the claims limitations as set forth above, but the reference does not explicitly disclose the specific pressure under which the reformer is kept while in operation. The specific pressure is not considered to confer patentability to the claims. As the reactor efficiency of operation and durability are variables that can be modified, among others, by adjusting said pressure under which the reformer is kept, with said reactor efficiency of operation and durability both increasing as the pressure is adjusted accordingly, the precise pressure would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the claimed pressure cannot be considered critical. Accordingly, one of

ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the pressure in the apparatus of Faville to obtain the desired balance between the reactor efficiency and durability (*In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (*In re Aller*, 105 USPQ 223).

With respect to claim 2, Faville teaches wherein an adsorption means (104 & 105) for adsorbing a medium which exists inside the container and propagates heat (col. 3, lines 30-32).

With respect to claims 4-6, Faville teaches wherein said reformer has a heating means (col. 8, lines 9-10) for generating heat to heat the micro reactor.

Regarding limitations recited in claims 7 and 12 which are directed to a manner of operating disclosed device, neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, process limitations do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

With respect to claims 8-9, Faville teaches wherein the micro reactor (123) comprises a reactor which changes the fluid from a liquid phase a gas phase (col. 7, lines 67-col. 8, lines 1-2).

With respect to claim 11, Faville teaches wherein a temperature measurement means exists for measuring the temperature of the micro reactor (col. 10, lines 62-67).

With respect to claims 23 and 25, Faville teaches an apparatus comprising: a micro reactor (fig. 1, 123) comprises a flow path for fluid (as illustrated by inlet (101) through outlet (107)); and container/system enclosure (100) which accommodates the micro reactor (123) and keeps an atmosphere on a periphery of the micro reactor at a pressure, at a pressure (see Abstract); Faville discloses wherein said micro-reformer (fig.1, 123) is contained within hot box (106) wherein said hot box (106) is maintained (which means kept) at a pressure (P3) which is lower than the pressure (P2) of the system enclosure (100) which is outside of said hot box (106) (col. 9, lines 31-39); and an adsorption means (104 & 105) for adsorbing a medium which exists inside the container and propagates heat (col. 3, lines 30-32). Faville further illustrates the presence of an inlet pipe and an outlet pipe which are connected to the flow path of the micro reactor, and which extend outward from the container/hot box (106), Faville however does not explicitly teach details on sealing the respective pipes, but since Faville teaches that the hot box (106) containing the reformer (123) is maintained at a certain pressure, therefore it would be obvious that

the pipes connected to the flow path of the micro reactor would be sealed in order to maintain the pressure setting within the apparatus.

Regarding limitations recited in claim 23 which are directed to a manner of operating disclosed device, neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, process limitations do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

Regarding claim 23, Faville teaches all of the claims limitations as set forth above, but the reference does not explicitly disclose the specific pressure under which the reformer is kept while in operation. The specific pressure is not considered to confer patentability to the claims. As the reactor efficiency of operation and reliability are variables that can be modified, among others, by adjusting said pressure under which the reformer is kept, with said reactor efficiency of operation and reliability both increasing as the pressure is adjusted accordingly, the precise pressure would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the claimed pressure cannot be considered critical. Accordingly, one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the pressure in the apparatus of Faville

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to obtain the desired balance between the reactor efficiency and reliability (*In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (*In re Aller*, 105 USPQ 223).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Faville et al. (US 6,562,496 B2), as applied to claim 23 above, and further in view of Wegeng et al. (US 2003/0015093 A1).

With respect to claim 24, Faville discloses all claim limitations as set forth above but fails to show wherein the adsorption means comprises a polyimide-based material. Wegeng teaches an apparatus for swing adsorption as applied to fuel reformers (page 9, paragraph [0096]) comprising a polyimide-based material in order to enhance the rate of indirect heat transfer (page 11, paragraph [0121], lines 11-20).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include a polyimide-based material as the adsorption means

in Faville's apparatus, as taught by Wegeng, in order to enhance the rate of indirect heat transfer.

7. Claims 10 and 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Faville et al. (US 6,562,496 B2), as applied to claim 23 above, and further in view of Struthers et al. (US 2002/0110712 A1).

With respect to claim 10, Faville discloses all claim limitations as set forth above but fails to show wherein the micro reactor comprises a reforming reactor which reforms carbon monoxide in the fluid into carbon dioxide. Struthers teaches a hydrogen generator (figure 1) comprising a reforming reactor/scavenger (22) (page 3, paragraph [0061]) which reforms carbon monoxide in the fluid into carbon dioxide in order to liquefy carbon dioxide and deliver it to a useful end (abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include a reforming reactor which reforms carbon monoxide in the fluid into carbon dioxide in Faville's apparatus, as taught by Struthers, in order to liquefy carbon dioxide and deliver it to a useful end.

With respect to claims 26-27, Faville discloses all claim limitations as set forth above but fails to show wherein the adsorption means has a surface coated with a material which physically/chemically adsorbs water or oxygen. Struthers teaches a hydrogen generator comprising an adsorption means (fig. 1, 20) comprising Yttrium and therefore can physically/chemically adsorbs water or oxygen in order to absorb sulfur (page 5, paragraph [0084]).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include an adsorption means comprising Yttrium in Faville's apparatus, as taught by Struthers, in order to absorb sulfur.

Response to Arguments

8. Applicant argues that neither Keegan et al. nor Faville suggest providing a sealed container to keep an atmosphere on a periphery of the micro reactor at a pressure of not more than 1 Pa, in the manner of the present invention as recited in amended independent claims 1 and 23, by which structure thermal conduction of heat to the outside is suppressed, which is clearly not disclosed by Keegan et al."

Examiner respectfully disagrees. Keegan for example teaches an apparatus comprising: a micro reactor/reformer (figure 4) (page 4, paragraph [0049], lines 1-8) in which a flow path is formed for a fluid (as illustrated by inlet (120) through outlet (125)); and container/system enclosure (130 & 220) which accommodates the micro reactor and keeps/(controls) an atmosphere on a periphery of the micro reactor at a pressure (Abstract) (page 4, paragraph [0051], lines 1-13); an inlet pipe and an outlet pipe which are connected to the flow path of the micro reactor, and which extend outward from the container and are sealed to the container (page 4, paragraph [0044]).

Furthermore, the claims describe operational conditions, such as the specific pressure of 1 Pa, which does not limit the invented apparatus. While features of an apparatus may be recited either structurally or functionally, claims directed to

apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997), see also *In re Swinehad*, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971); *In re Danly*, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959).

"Apparatus claims cover what a device is, not what a device does." *Hewlett-packard Co. v. Bausch & Lomb Inc.*, 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990) (emphasis in original). MPEP 2114.

Regarding claim 1, Keegan teaches all of the claims limitations as set forth above, but the reference does not explicitly disclose the specific pressure under which the reformer is kept while in operation. The specific pressure is not considered to confer patentability to the claims. As the reactor efficiency of operation and reliability are variables that can be modified, among others, by adjusting said pressure under which the reformer is kept, with said reactor efficiency of operation and reliability both improving as the pressure is adjusted accordingly, the precise pressure would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the claimed pressure cannot be considered critical. Accordingly, one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the pressure in the apparatus of Keegan to obtain the desired balance between the reactor efficiency and reliability (*In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering

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the optimum or workable ranges involves only routine skill in the art. (*In re Aller*, 105 USPQ 223).

It is maintained that the pressure of the atmosphere in which the container accommodates the micro reactor is a process/operational limitation. Both Keegen and Faville teach structures that are capable of being operated at different pressures as set forth in the rejection above.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., by which structure thermal conduction of heat to the outside is suppressed) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaity Handal whose telephone number is (571) 272-8520. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KH

8/9/2007



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